

Another way of classifying production activity based on the quantity of product made.

Job shop –

Batch production –

Mass production –

Types of Automation–The word ‘Automation’ is derived from greek words “Auto”(self) and “Matos” (moving). Automation therefore is the mechanism for systems that “move by itself”.

- Fixed auton–
- Programmable Auton–
- Flexible Automation–

1– Fixed automation–

Characteristics–

- Used where production rates are high
- High initial cost due to tailor made equipment
- Normally cannot accommodate product changes
- Depends largely on skill to organize the operations

Eg– mechanised assembly lines

Machining transfer line

Steps to Implement Hard/Fixed Automation–

There are six steps towards implementation of fixed automon:

- 1–
- 2–
- 3–
- 4–
- 5–
- 6–

2– Programmable automation–

Characteristics–

- Costly, but general purpose m/c ry
- Low producn rate
- Normally little flexibility to suit changes in product specifications
- Suitable for batch producn

Eg– NC m/c

Industrial robots

3– Flexible automation–

Characteristics–

- Suitable for continuous prodn of variety of products
- Highly initial cost for tailor made CNCs
- Medium to prodn rate/vol
- Highly flexible for product changes

Eg– use of pallets for holding parts

- Pallet or honey box–type tool holders in CNC
- FMS and m/cing centers
- AGV for material handling

Automation is a set of technologies that results in operation of machines and systems without significant human intervention and achieves performance superior to manual operation.

Need for Auton(bjectives)–

- | | | |
|----------------------|--|-------------------|
| 1–high prodn reqts | 2–Reduce lead time | 3–better quality |
| 4–costly raw mat | 5–safety in opns | 6–labour shortage |
| 7–higher labour cost | 8–shifting of manpower to service sector | |
| 9–Reduce WIP | 10–competitive prodn | |

Advantages of Automn-

- 1- reduced lead time
- 2-set-up time elimination
- 3-better products with lower price
- 4-safer working conditions
- 5-lesser working conditions
- 6-employment opportunities
- 7-increased standard of living

Disadvantages of Automn-

- 1- system changes are difficult and slow to implement
- 2-high cost and long term payback
- 3-lower skill levels of workers
- 4-Retrenchment or unemployment
- 5-Reduced purchasing power

Automn strategies-

- 1- combined opns
- 2-simultaneous opns
- 3-integration of workstations
- 4-specialised machinery
- 5-flexibility
- 6- imroved mat handling
- 7- on line inspections
- 8-process control
- 9- plant opn control
- 10-CIM

Table 1 Types of automation: Advantages and disadvantages

Automation	When to consider	Advantages	Disadvantages
Fixed	High demand volume, long product life cycles	<ul style="list-style-type: none"> • maximum efficiency • low unit cost 	<ul style="list-style-type: none"> • large initial investment • inflexibility
Programmable	Batch production, products with different options	<ul style="list-style-type: none"> • flexibility to deal with changes in product • low unit cost for large batches 	<ul style="list-style-type: none"> • new product requires long set up time • high unit cost relative to fixed automation
Flexible	Low production rates, varying demand, short product life cycles	<ul style="list-style-type: none"> • flexibility to deal with design variations • customized products 	<ul style="list-style-type: none"> • large initial investment • high unit cost relative to fixed or programmable automation